Hobbies WEEKLY

CONTENTS

November 24th 1948 Price Threepence Vol. 107 No. 2769

Model of a Modern ROAD ROLLER

THE flint and sand method of road making and surfacing has almost disappeared, and the bituminous surface taken its place. We do not, therefore, these days, see much of the old steam road roller, and its place has been taken by the more up-to-date Diesel-engined roller pictured in our sketch. It is an interesting model to make up in wood. It might be of interest to note, in passing, that Sir Thomas Aveling invented the steam roller in 1867, and since then the firm of Aveling and Barford, Grantham, have been the pioneers in the introduction of new ideas to meet new needs in the art of road making and surfacing. The present model was prepared from constructional diagrams and data having been generously loaned by that firm for the purpose.

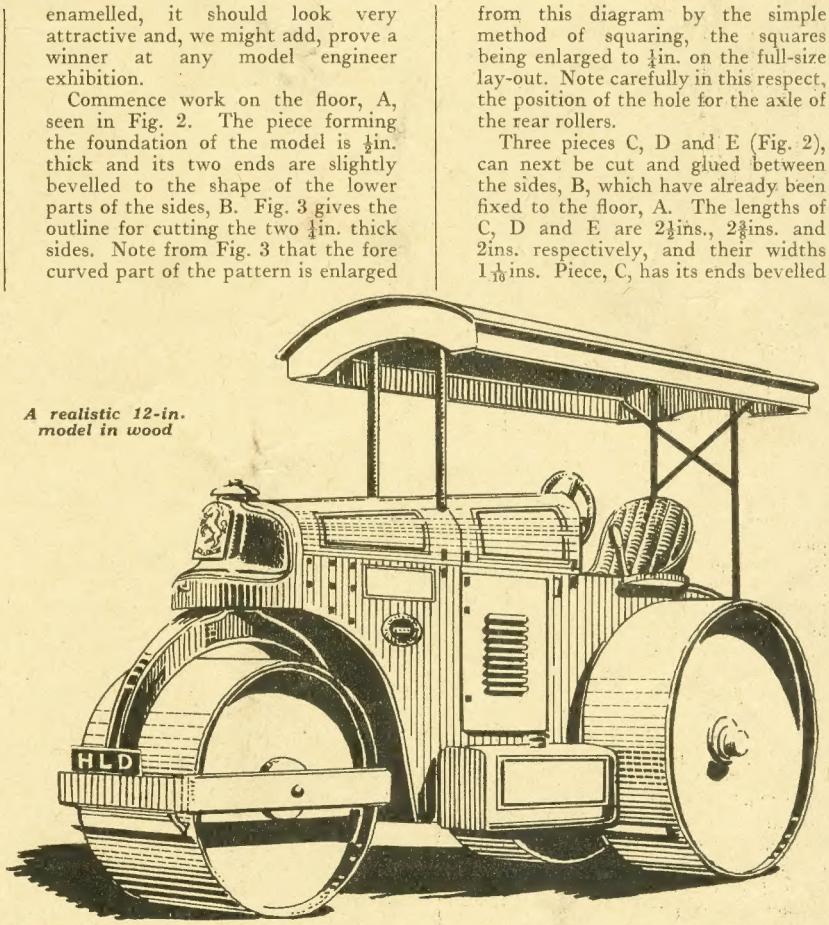
Part Diagrams

The model has a length of 11⅜ins. and height 6½ins. We give in Fig. 1 a side view and a front view which show the position of all the parts. Below the diagrams is a scale for measuring off certain parts which, perhaps, do not appear quite plain in the other diagrams. The whole model is made from wood with stout card for the treads of the rollers and the top part of the awning, etc.

It is really a very simple model to construct, as all the pieces contained are straightforward in shape, and easily cut with the fretsaw. Here little additional hand shaping is required, and when the model has been completed and painted or enamelled, it should look very attractive and, we might add, prove a winner at any model engineer exhibition.

Commence work on the floor, A, seen in Fig. 2. The piece forming the foundation of the model is ½in. thick and its two ends are slightly bevelled to the shape of the lower parts of the sides, B. Fig. 3 gives the outline for cutting the two ¼in. thick sides. Note from Fig. 3 that the fore curved part of the pattern is enlarged from this diagram by the simple method of squaring, the squares being enlarged to ¼in. on the full-size lay-out. Note carefully in this respect, the position of the hole for the axle of the rear rollers.

Three pieces C, D and E (Fig. 2), can next be cut and glued between the sides, B, which have already been fixed to the floor, A. The lengths of C, D and E are 2½ins., 2⅜ins. and 2ins. respectively, and their widths 1 1/16 ins. Piece, C, has its ends bevelled



A realistic 12-in. model in wood

to fit as seen in Fig. 2. Pieces, D and E, are square across. A cross rail, F (Fig. 2), is glued and pinned between the sides to support the head of the front roller. This rail measures $1\frac{1}{16}$ins. by $\frac{1}{2}$in. by $\frac{1}{4}$in.

From a block of wood measuring $4\frac{1}{2}$ins. by $1\frac{5}{8}$ins. by $\frac{7}{8}$in., the main top engine covering, G, is cut and shaped. In Fig. 4 the piece is shown shaped and tapered. To the large end of this covering piece is fixed a shaped $\frac{1}{8}$in. thick piece, H, $1\frac{1}{8}$ins. wide and 1in. deep. It takes the same curve as the

out in colour on a thin piece of wood and glued to the top of the turned front.

Complete the body by adding the curved back end, of stout card bent round to the curve of the two sides. The seat and its side guards are made from pieces, I, J, and K, in Fig. 6. Piece, I, is cut to the shape shown with piece, J, made of card and bent round to form the back. The two side guards, K, measure $1\frac{1}{8}$ins. long by $\frac{3}{4}$in. wide and $\frac{1}{8}$in. thick. They are checked out to meet the seat (see

are $\frac{3}{8}$in. in diameter and have, of course, a $\frac{1}{4}$in. hole in the centre.

In assembling the rollers glue one on to the axle, allowing the latter to project on the face $\frac{1}{8}$in. Then push the axle through the body of the machine and out through the opposite side. The second roller is then added to match the first, regarding the spacing, etc. A full $\frac{1}{8}$in. should thus be allowed as clearance between the edge of the rollers and the body of the machine, see front view, Fig. 1.

For the front roller a similar

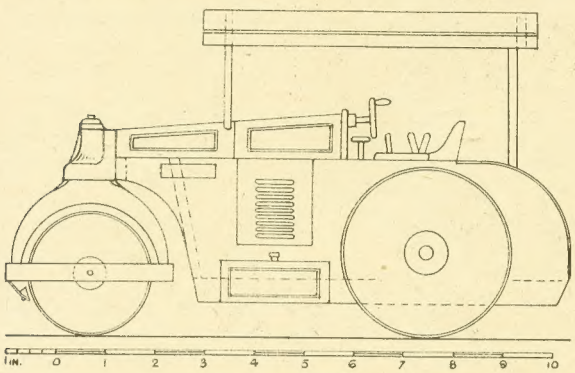
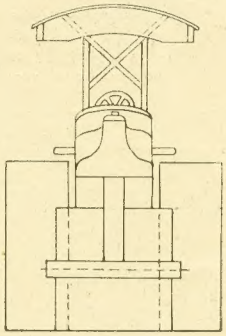


Fig. 1—Side and end elevation with helpful scale in inches



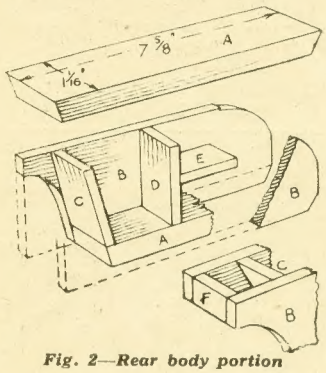


Fig. 2—Rear body portion

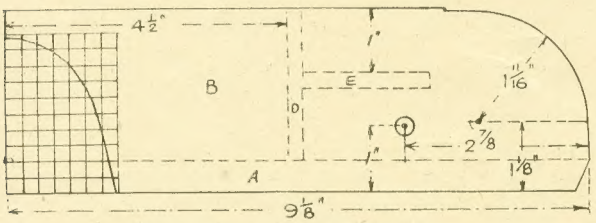


Fig. 3—Shape of sides of the body

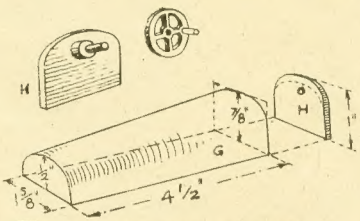


Fig. 4—Engine cover and wheel

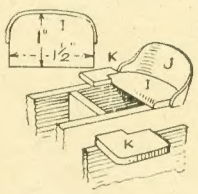


Fig. 6—Seat details

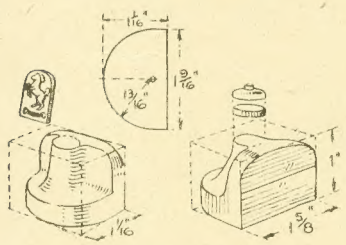


Fig. 5—Shaped engine front

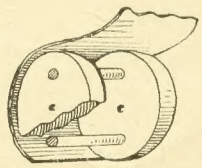


Fig. 8—Front roller construction

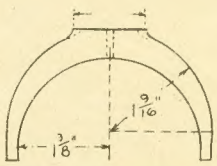


Fig. 9—Front roller holder

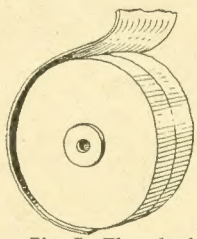


Fig. 7—The wheels

piece, C, shown by the dotted line in the diagram. Cut a $\frac{1}{8}$in. hole in piece, H, to take a short length of rod to represent the steering pillar. Then over the latter, glue on a washer $\frac{1}{4}$in. diameter and $\frac{1}{8}$in. thick. The steering wheel shown in Fig. 4 is made from $\frac{1}{8}$in. wood and is $\frac{7}{8}$in. in diameter, with rounded edge and a short piece of rod to serve as a handle.

The shaped front of the machine, above the front roller, is made from a solid block of wood, $1\frac{5}{8}$ins. by $1\frac{1}{16}$ins. by 1in. The shaping can be got by studying the two details and the plan in Fig. 5. Two little caps are made from $\frac{1}{8}$in. wood as shown, $\frac{1}{2}$in. in diameter and glued on, while the trade mark "Invicta", showing the rampant horse trade sign is carried

Fig. 6) and glued in place. Round the front edge of the seat and three edges of the side pieces, K.

The large rollers and the back axle are next made. First cut a piece of $\frac{1}{4}$in. round rod for the axle $4\frac{3}{8}$ins. long and round off each end with file and glasspaper. Fig. 7 shows how the rollers are constructed from two $\frac{1}{2}$in. discs of wood glued together and with stout card glued round. The radius for the wheels is $1\frac{5}{8}$ins.

The card will be cut in two strips, each being $1\frac{1}{4}$ins. wide by about 11ins. long, to allow for trimming off to a butt joint.

On the outside of the rollers a $\frac{1}{8}$in. disc is glued, while on that side nearest the body of the machine, a $\frac{1}{4}$in. disc or washer is added. Both

method of construction may be adopted. Four $2\frac{3}{8}$ins. diameter $\frac{1}{2}$in. thick discs are cut and glued and clamped together and a strip of card, measuring 8ins. long and $2\frac{3}{8}$ins. wide, bent round and glued on firmly. As an alternative two, instead of four, discs are cut and these are held apart by two or more 2in. lengths of round rod glued firmly into holes drilled in the discs just as seen in the diagram, Fig. 8. The card will be bent round in the same way as the previous method.

The main support for the front roller is made from $\frac{3}{8}$in. wood, cut to the shape in Fig. 9. Drill a $\frac{1}{8}$in. diameter hole through the thick upper part to take the screw which will pivot the support to the front end of

(*Continued foot of page* 91)

How to add lighting and heating circuits to make an ELECTRIFIED DOLL'S HOUSE

EVERY building that has any pretensions of being up-to-date must necessarily be "all-electric". The Doll's House, for instance, made from our Design No. 237 Special and illustrated in Fig. 1, must be no exception to modern practice. It will greatly add to the interest and realism of this model if it is fitted up in the modern manner with electric lighting and heating.

A number of realistic tiny fittings are now obtainable, as well as plastic furnishings, and the electric fittings can be made use of in the following instructions.

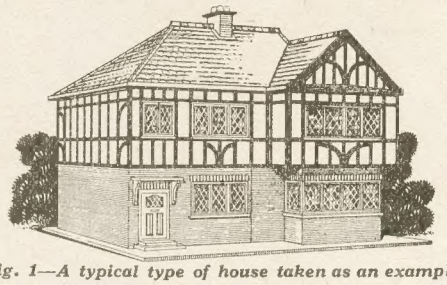


Fig. 1—A typical type of house taken as an example

Safety First

The first essential, of course, in planning the electrical equipment of the Doll's House is to ensure complete safety, both from fire or from accidental shock. For this reason it is obviously safer to take the supply from a low-voltage battery and not from any household electric service. Practically all miniature electric fittings are made with tiny low-voltage lamps which cannot be used on high voltages.

Using Batteries

The dry battery is much to be preferred to the accumulator. It has no acids or liquids to spill, nor is there so much danger of spoiling it by accidental short-circuiting the terminals. For the purpose, therefore, the most convenient economical and safe way of providing current will be to obtain two large square dry cells. Allowing for special occasions when all the lights will be on in each room of the doll's house at one time, this battery will be large enough to last for several months, if the lights are not on too long.

Accommodation for the two batteries may be provided by an additional lean-to shed or a garage at the back or side of the doll's house. Or they may be located in the roof.

The two dry cells connected up in series will give current at approximately 3 volts, which besides being suitable for these miniature lamps, is an absolutely safe voltage to handle.

General Wiring Scheme

Before describing the method of wiring in detail, a simple diagram as Fig. 2 of the arrangement will help to make matters quite clear. Here, one fitting only is shown, merely to illustrate the principle in connecting it to the electric circuit, without reference to any actual position it may take up in the house.

The two dry batteries, A, are shown connected in series. That is, the positive terminal of one is joined to the negative terminal of the other. The two free battery terminals are then connected to two bars, C,C, which run along the back wall outside each room. They can thus be made use of at any point convenient for connecting on individual fittings such as lamps and fires.

In any of these branch circuits a separate switch, D, can be included, if desired, so each appliance can be cut off or on without affecting the rest.

Or for the sake of simplicity the switches at D can be omitted, and one only fixed at B between one of the "bars" and the battery. Operating this switch will then turn all the lights in the house on or off simultaneously.

The Bars

The best arrangement for the bars will be as in Figs. 3 and 4. These show the back view of the doll's house with its six rooms indicated by the dotted lines, and the holes made for the passage of the flex into each compartment.

Across the middle of each room two brass strips or stout wire are fixed on the back of the house, strips ⅜in. wide by 24 gauge would suit very well. These strips will be screwed to the back wall as shown in Fig. 4. Small washers are placed under the fixing points to keep the bars just clear of the back and allow room for the spring clips used for connecting on the branch circuits. The method is illustrated in Fig. 5. At the extreme end of the bars nearest the battery two terminals, A and B, are fixed to lead in current from the battery.

Constant Light

Notice particularly that by feeding current to the starting end of one bar and the finishing end of the other the length in circuit is approximately the same, at whatever point current is lead off to a branch.

This avoids any excessive variation in the brilliancy of the lamps due to unequal "volt-drop". Otherwise, those nearest the battery would

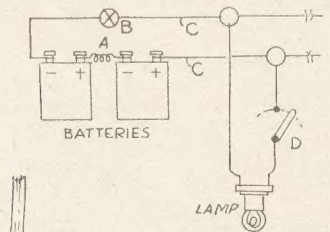


Fig. 2—(above) Simple wiring diagram

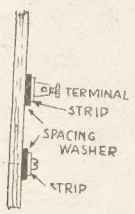


Fig. 4—(left) Section of back wall

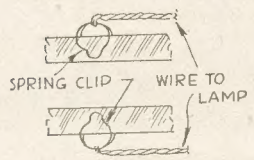


Fig. 5—Clip contacts to strips

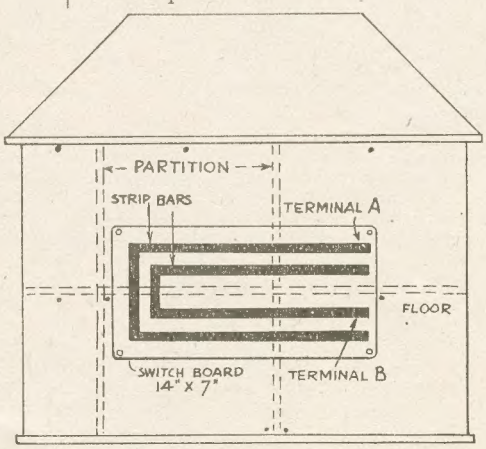


Fig. 3—Bar strip positions on back of house

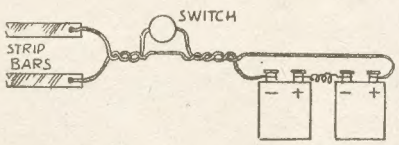


Fig. 6—Inserting a separate switch

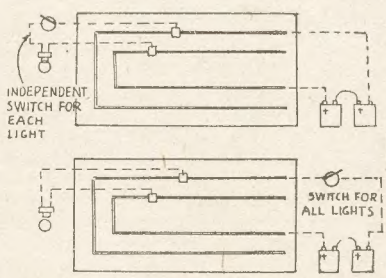


Fig. 7—Distribution of lights suggested

glow more brightly than those farthest off.

Battery to Bars

For connecting the batteries to the bars and to one another a length of 5-amp. twin-flex such as used with ordinary household appliances is convenient. It can be tucked away out of sight in the "shed", or wherever the battery position decided upon may be. The required length can be measured when the latter point has been settled, leaving an extra 6ins. or so for emergencies.

If the battery position is outside the building the ends of the twin flex can be attached direct to the terminals A and B, Fig. 3. If they are inside the building, a hole large enough to pass the flex will have to be bored through the back of the building to enable the ends to be attached to the bar terminals.

Main Switch

The same position will also do for fixing a main switch (in Fig. 3) to control all the lights together from one point. To bring this switch into the circuit, divide one of the wires of the twin flex as in Fig. 6, and after baring the insulation for about ¾in., twist the bare-stranded wires together tightly where they pass into the terminal posts.

To prevent the unsightly appearance of the braided covering fraying back, slip a short length of rubber cycle valve tubing over the ends.

The Branch Circuits

When all the lights and fittings are intended to be controlled from one switch (as in Fig. 6), the branch circuits to the various items in the rooms are very simply made. Nearly all the miniature electric light fittings on the market are made with their own connections, the wires terminating in a small spring wire clip, similar to those used as paper fasteners.

The Wiring

After fixing the lamp, etc., therefore, in its required position, it is only necessary to carry the wire connection along the nearest convenient angle in the room. Pass the connections out to the bars at the back of the room through a hole drilled in a suitable position. The two spring terminal clips are then pushed over their respective bars (shown in Fig. 5).

To avoid drilling large holes, the clips can be removed temporarily by untwisting the wires, replacing them after the wires have been passed through to the back.

When each of the branch circuits has to be controlled by its own switch the circuit can be treated exactly as in Fig. 6, the switch being inserted in one only of the twin connecting wires, which is divided for that purpose.

Grouping

In most cases readers will prefer to use their own judgment regarding the arrangement and grouping of the various kinds of fittings in each room. The following, however, might be found useful for the doll's house under review. Entrance Hall: one ceiling light with coloured globe a little out of centre in the ceiling to allow of staircase if the latter is included. Dining: one electric fire in place of open grate as desired and one ceiling lamp and shade. Drawing Room: one electric fire, one portable standard lamp. Kitchen: one centre ceiling lamp and shade, that is, if a Kitchen is taking the place of either of the above rooms. Bedrooms: one centre ceiling pendant with shade. Bathroom: one centre ceiling light and shade. The two diagrams in Fig. 7 show the distribution of lights, etc., under the two methods described in the earlier part of this article. The reader may remember that the Doll's House described was No. 237 Special, and patterns for it are obtainable for 10d. post free.

From the Editor's Notebook—

WHAT friendly and helpful people my readers are, to be sure! Some time ago C. Hardy of Whangarei, New Zealand, asked me to get him a Coronation Coach design which was published years ago and is now out of print. I mentioned his need in a Note, and now he tells me quite a number of readers wrote him with an offer of one. One reader sent half a plan of the Lord Mayor's Coach, which showed a good spirit but was not altogether helpful! Anyhow Mr. Hardy was very grateful and says that "quite a number of enthusiasts scattered all over New Zealand will be oiling their machines as soon as plans and materials become available"!

* * *

DO you realize what an amazing variety of models it is possible to make from our designs and the articles in these pages? I was struck by this thought in reading a letter from Mr. A. Smallbone of 11 Rossetti Gardens, Flood Street, Chelsea, S.W.3 recently. He has been a user of the fretsaw for many years, and expresses his gratitude of the help of these pages with suitable appreciation. He made the old-time Locomotive, the "Human Torpedo" (1944), the Roman Catapult, and various ships. What an interest such a range brings in the construction of each. The same reader suggests a model of an early type steamship which brought in the era of steam in the Atlantic crossings. No doubt he, and other readers, will be glad to know I have a design for one in hand for early publication. By the way, Mr. Smallbone is willing to pay a good price for a copy of the design of the Sydney Bridge Model (No. 1900) which we published about ten years ago and is now out of print. Perhaps some reader can oblige.

* * *

MOST readers, who are handymen about the home, will be interested in a new type of wall plug, useful on all those occasions when screws are required to hold fast in brick, plaster, compositions, etc., or even in rubber, concrete and glass. The Hewitt Wall Plug has a fluted side, and is compressible, so it can be inserted into a closely fitting hole. The fact that the plugs can be cleanly cut by a reasonably sharp knife, and that screws can be replaced at any time without in any way impairing the holding power of the plugs, will prove a great saving of time and trouble to the amateur domestic handyman. They are obtainable from ironmongers or usual stores or you can read particulars in our advertisement pages from to time time.

* * *

AN offer is made by C. F. Parsons, 50 High Street, Warwick, to present a copy of the pre-war design of Big Ben, No. 209 Special to a reader. Should several write to him, of course, he can only choose one, and readers should write direct to the address given.

* * *

MOST pastime subjects have been dealt with in books, and you can learn a lot in this way without having to do it the hard way of experience. My library shelves cover most of the needs of anyone with a hobby, and I can usually recommend you to some books of interest if you care to enquire. The books themselves can generally be obtained on loan from the local council, municipal or county library or of course you can buy them from booksellers in the usual way.

The Editor

Hints by which you can ensure getting GOOD RADIO RESULTS

THE radio constructor or listener can attend to a number of items which should not be overlooked if best results are to be obtained. He should not be satisfied with distorted or mediocre reception, but search for the fault and remedy it. This further article on radio generally will be as helpful as the others to the amateur radio fan.

Aerials

With a small receiver the efficiency of the aerial can make a vast difference. With powerful receivers the effect is less noticeable, though even with these a good aerial will improve reception of distant stations.

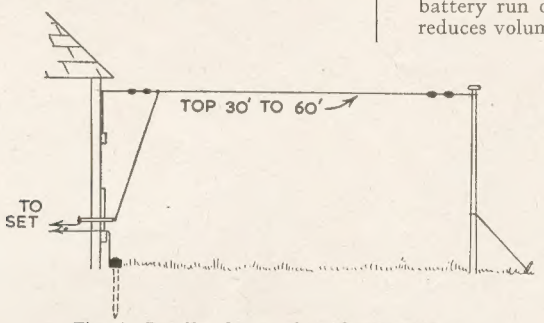


Fig. 1—Details of a good outdoor aerial

A sound outside aerial is illustrated in Fig. 1. The down-lead should be 1ft. or more from the walls, and the top portion should be as high as possible. Actually it is the height above earthed objects which is most important, so it is best not to have the wire over buildings. With a crystal set try to get up at least 50 ft. of wire to assure maximum volume. The lead-in should be of well-insulated wire, or a tube can be used. Two or three insulators should be added at each end of the top portion.

Indoor aerials *can* give good results, even with crystal sets. It is usually best to take the wire round two sides only of the room, and down the corner to the receiver. The thin, inconspicuous, plastic-covered wire is very suitable.

Earths

Connecting a good earth to a small set can change a signal from a whisper to ample volume. Contact to the ground itself is necessary. Sometimes rising water-pipes can be used; if not, a metal earth tube or spike should be driven at a spot where the soil does not become too dry.

Battery Tappings

Fig. 2 will help to show how the different voltages influence results. High Tension Plus always goes in the maximum voltage socket. If a Screen Grid plug is provided, its position must be found by trial. As the voltage applied is increased, efficiency increases to a certain point, then begins to fall off again. The best voltage is generally between 50 and 90.

The voltage applied to the Detector governs the ease with which the valve oscillates. Too low a voltage will give weak results; too high a voltage violent reaction which does not build up the signal fully. So this plug should be tried in various sockets on the battery, and results noted.

Of all voltages, Grid Bias is most critical. Low bias makes the H.T. battery run down quickly; high bias reduces volume and causes distortion.

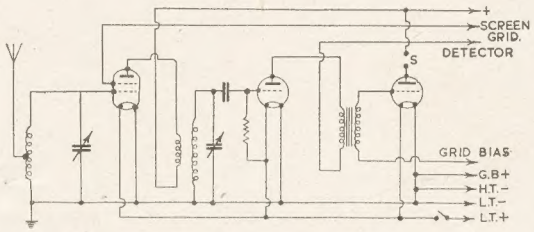


Fig. 2—Diagram of the voltages applied

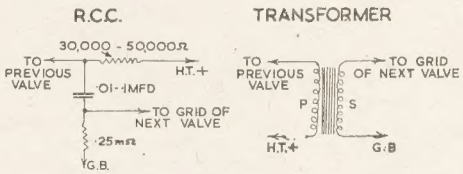


Fig. 3—Particulars of changing coupling

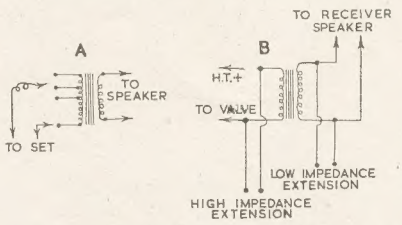


Fig. 4—Circuit for output matching

As the bias depends on the valve (or valves), adjust the plug (or plugs) 1·5 volts at a time, until best results are obtained. Always apply as much bias as the valve will take without reception being spoiled.

Intervalve Couplings

Because Resistance Capacity Coupling is much cheaper, it is quite often used where transformer coupling would give much louder results. Fig. 3 shows the difference, and the connections. In a small 2 or 3-valver, a transformer should always be used if maximum volume is wanted.

Normally it should have a step-up ratio of between 1 : 3 and 1 : 5. (The R.C. Coupling cannot step-up signals, of course.) In Fig. 3, "P" indicates the Primary, and "S" the Secondary. Sometimes it is worth while trying the effect of reversing the connections to the Secondary.

As the primary has far less resistance than the 30,000 to 50,000 ohm resistor, more voltage reaches the previous valve, which is often an added advantage.

Output Matching

For maximum volume to be realised, the impedance of the speaker should match that of the valve driving it. Many speaker transformers have several tappings on the primary, as shown at "A", Fig. 4. By trying combinations of these the best tapping can be found. The correct tapping is that giving maximum volume and best quality.

Sometimes confusion arises when connecting an extra or extension speaker. Two main impedances (impedance—alternating current resistance) are in general use. One is from 5 to 15 ohms, the other approximately one hundred times greater. Therefore if a low-impedance speaker is connected where a high-impedance one is required, or vice versa, results will be very poor indeed, signals being almost inaudible.

High - impedance extensions are always connected to the valve anode and H.T. Plus: that is, to the *primary* of the speaker transformer in the receiver. Low-impedance speakers must be connected to the *secondary* of this transformer, as shown in "B", Fig. 4. Moving-coil speakers without transformer should be connected in this way.

All high-resistance earphones of 500 to 2,000 ohms may be connected directly to the anode of the output valve, though they should not, of course, be used with valves giving a very powerful output. However, large supplies of ex-service low-resistance phones are on the market, and these should be treated as moving-coil speakers as regards matching with a transformer.

Notes about the track in the construction of MODEL RAILWAYS

THERE are, of course, many different types of model railway tracks at present on the market, ranging from the cheaper "tinplate" to true-scale permanent way. Each class has some special feature claimed for its use. Thus, tinplate track is evidently the best type to use if the layout is of a semi-permanent or portable nature. The better classes of track, which boast varying degrees of fidelity to the real thing are best to use if the railway is to be permanently housed in a loft or garden shed.

With tinplate track, there is the one disadvantage of not being able to lay it in any configuration desired, this being due to the fact that each individual piece is mathematically designed to fit with any other piece without any need for cutting or bending.

Altered Lay-outs

Admittedly, there are many different workable layouts possible with tinplate, but it will be found well-nigh impossible to reproduce any given prototype layout of a station or goods yard without either cutting or bending the rails.

If the track being used consists of a simple "oval" of tinplate, it is easily possible to arrange it to allow a train to be run in each direction at the same time by incorporating a loop line along one or other of the flat sides of the oval.

Or, alternatively, a loop may be added which also includes a short siding at one or both ends of the loop; and by this means a greater amount of instructive amusement may be obtained by working in a goods train from the siding, and allowing it to run "turn and turn about" with the main-line passenger train.

With Large Baseboard

As the more general "oval" of track is placed upon a baseboard which will only just accommodate it, it will frequently be found that such station buildings as are added will of necessity be placed within the oval of track; and in this position they do not look at all convincing. If at all possible, it is best to try and arrange for a baseboard about 6ins. larger in each direction than the size of the actual tracks.

At this juncture it will be well to settle once and for all, the much-discussed question of the advisability of laying tinplate (or steel track, for that matter) out of doors.

Neither tinplate track, steel track nor "sheridized"-steel track is effective when laid out-of-doors except during the summer months; and then only when the weather is really kind. Rust, of a particularly pernicious character sets in very quickly, being aided in its destructive work by dew as well as rain; and the writer has conclusively proved that no amount of creosoting, painting or other dressing will effectively preserve the running surface through a normal English winter.

Outdoor Running

If outdoor running is desired, then brass scale track should be used, and even so, it should be mounted at least 1ft. above ground level to keep it free of worm-casts, fallen leaves and rain-splashed earth.

Reverting to the types of model track available, it should be remembered that, as there are still in existence (on the second-hand market, particularly) many different rail-sections, care should be taken to ensure that the rail purchased will line-up with that already possessed, so that rail-joints are truly in line and that any point-work is standardized.

In this matter it is well to bear in mind that if a layout is situated 2ft. or 3ft. above floor level, a derailment caused by shoddily-laid or badly-matched rails can well involve the user in a crash to the floor of many pounds-worth of rolling-stock.

For choice, brass track is to be desired; firstly, on account of the ease with which it can be worked up into points and crossings (which makes for a financial saving), and secondly, on account of the ease with which it can be kept clean; this latter feature being all-important if the railway is an electrically-driven one.

Steel Tracks

Steel track, on the other hand, is made of the same material as the "real thing", and naturally looks more realistic; but it is, however, much more difficult to keep clean, and far more obstinate of manipulation.

The zinc-coated "sheradized" steel rail is not, by any means permanently rustless. The coating will eventually wear off, and its useful life depends upon the amount of wear and the atmospheric conditions prevailing on the railway.

There is a great advantage to be gained by mounting the track upon battens of flat stripwood laid parallel with the rails beneath the sleepers. It lies in the fact that should any track alterations be desired to an existing layout, it is obviously more simple to take up the track which has been strengthened by battens, than if the latter were not present.

Even brass track gets covered with an impalpable layer of greasy dust; and to remove this it will be found best to make a swab of a piece of linen (not of any material from which hairs or strands will readily be withdrawn) soaked in petrol. Upon rubbing this along the track all the grime and most of the superficial tarnish will at once disappear, and the track be left in a sweet-running condition. Never use paraffin or methylated spirits for cleaning rails.

Rusty track can be quickly cleaned by thoroughly soaking it in ordinary "household" (cloudy) ammonia for about half-an-hour, rubbing them to dislodge any rusty particles, and finally washing them in hot water and allowing to dry.

About Ballast

Generally speaking, ballast is not to be advised on track unless it is completely free from dust and fine grit, and is fixed down to the base-board in some way. Free ballast has an annoying habit of getting thrown up into the gears of passing engines with very bad results to their mechanisms. However, there is a source of "ballast" which is available to all model railwaymen, and one which may be stuck down to the baseboard with weak glue or even paste. It is none other than stale bread, of which most households get a fair amount.

Size for "O" Gauge

If the old bread—with its crusts—is placed in the oven and thoroughly baked till it is as hard as the proverbial brick, it may be ground as fine as desired by rolling on a hard surface beneath a rolling-pin. The lumps should be about $\frac{1}{8}$in. across for an "O" gauge railway, and all the useless dust should be thrown away. The lumps will be found to consist of a delightfully indiscriminate assortment of earthy-coloured particles which will represent ballast to an ideal degree. This material should be stuck down to the track and base-board, afterwards being treated to a thin coat of size or weak glue to still further hold it in place.

Preservation

A good tip for preserving the running surface of steel track used out-of-doors is that of rubbing a block of household black-lead along the rail-heads. As this substance is classed among the conductors of electricity, and the film between the wheels of the engine and the track is so thin, it may be used on lines operated electrically; thereby materially improving the contact between the locomotive and the track.

(To be continued)

This handy ironing article for the housewife is

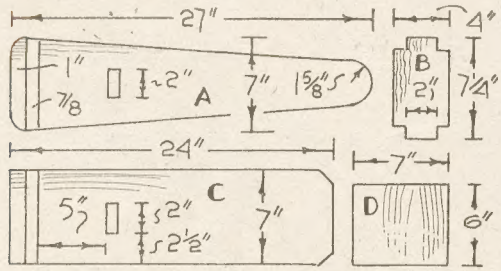
A SLEEVE BOARD

AN ironing board is ideal for most purposes, but where the sleeves of certain garments are concerned, a special board is needed, and a typical item is illustrated herewith. It will be seen that very few parts are required. Almost any sort of ⅞in. thick wood can be used. White deal or red cedar is undoubtedly more readily obtainable.

The Arm Wood

You need a piece for the arm 27ins. by 7ins. This must be shaped as shown, then mortised and checked ¼in. deep. This also applies to the base piece. The mortises, of course, are 2ins. by ⅞in., the checking being ⅞in. wide by ¼in. deep.

With a tri-square, mark off the guide lines, then the depth of the groove. The guide lines should be cut across with a chisel or penknife, then a corner removed as a guide for the teeth of a tenon saw. Make the cuts ¼in. deep, then proceed to remove the waste wood with ¾in. chisel, or a router, the cutter of which should be set to ¼in.



The shaped wooden parts required

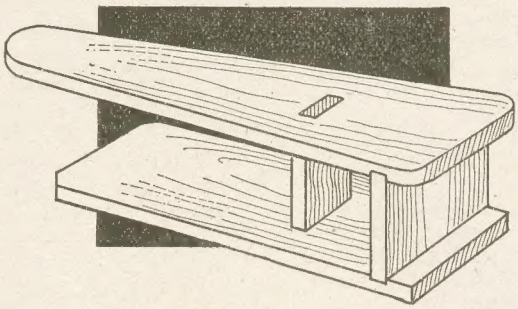
Having prepared parts A and C, make the supports, B and D. Note the direction of the grain. B should be a neat, tight fit in the mortises of A and C. Try the parts temporarily together. If fitting truly, assemble with glue and screws, using 1½in. by 8 flathead iron screws.

The heads should be countersunk slightly below the surface of the wood. Have about three screws driven into D, with a single screw at each side of the tenons of B.

With medium glasspaper wrapped in a cork block, remove the sharp edges from the wood. The arm now needs to be padded. Like the board on ironing tables, the arm is first covered with flannel or blanket to act as a cushion.

To get the shape, turn the arm up on the material and cut around it to leave a 1in. margin all round. Turn the work upright again and tack the material to the arm. The blanket or flannel needs to be covered with linen.

The treatment for the padding material is similar as the covering material. The edges are set off with strapping and studs, or brass-headed nails. There is no need to stain or paint the board. In its natural state the wood is sure to get dirty so perhaps it is as well to darken down the base portion at least. Use a good hard paint.



Complete board before being covered with material

Material Cover

To save using strapping, you should allow 2ins. of a margin all round, then put a fold in the material (a 1in. hem) so the cut edge is at the inside. The fold should be level with the edge of the arm, at the underside.

There must be no wrinkles in the flannel and linen coverings. It is a good plan to tack down the ends first, then do one side. When tacking the remaining side, put some stretch into the material to take up any slackness. Some women prefer two coverings of linen, especially if it is woven very openly. Flour bags provide suitable material for the purpose, or old pillow cases, bed sheets, etc.

Road Roller—(*Continued from page* 86)

the machine. Then connect up the two extremities of the support with a simple framework of ⅜in. by 3/16in. wood (see Fig. 10), with small glued angle blocks inserted as shown to hold the frame firmly together.

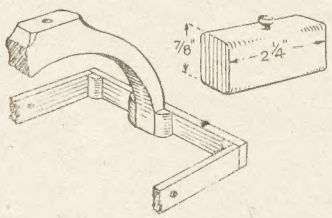


Fig. 10—Front roller support

Drill holes in the side rails of the frame to take a length of ⅛in. round rod which runs through from side to side and through the holes in the roller. While putting the roller on the rod add two ⅝in. diameter washers as spacing washers to go between the frame and the end disc of the roller.

Included in Fig. 10 is a diagram of a simple box which is to go on the left side of the model (Fig. 1). It is made from two pieces of ⅜in. stuff glued together and afterwards shaped and fitted with a little wood capping.

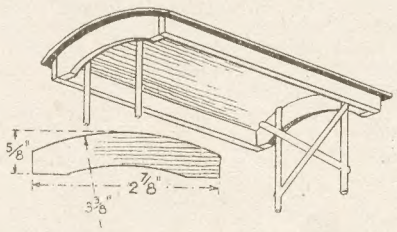


Fig. 11—Canopy and support rods

Details of awning are given in Fig. 11. Two side rails ⅜in. by 3/16in. in section and 6¾ins. long are fixed to two shaped ends (see Fig. 11). Over this is carried a sheet of stout card 3½ins. wide by 6¾ins. long. Add some small glued blocking pieces on the underside to strengthen before fixing it to the machine. A suggestion is given for making the trellis supports for the awning. A cross piece is first made up as shown in the front view, Fig. 1, from ¼in. or 3/16in. strips, and these are directly fixed to the inside of the end section of the awning. Then the four uprights are carried down to glue on the inside of the sides at the back and down to the shaped engine cover at the front. Holes can be made to receive the ends of the uprights glued in. Levers and brake wheel can be added as desired.

Suitable Colouring

The whole model would look well finished in green and yellow enamel with certain details picked out in black. The panelling on the sides should be in line on the green backing, an edging of red giving a touch of the brilliancy here needed. The underpart and top of the awning should be light grey with the treads of the rollers also in this colour. Careful painting must be done for good results.

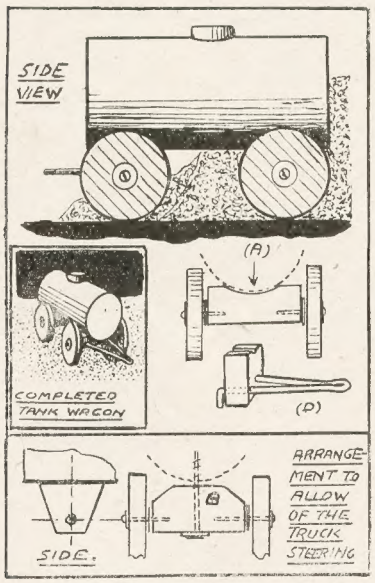
How odds and ends can be used in making
TWO TOY TRUCKS

TO be a first-class job, toys should be realistic, that is resemble as close as possible miniatures of the article portrayed. It is a great mistake, however, to fall into the error of thinking that to be realistic a toy must have a lot of elaborate work put into it.

Toys, too, should be fairly easily put together, and in the articles described here the two characteristics of realism and simplicity are well to the fore.

Timber Truck

First, let us consider the timber carriage. All kiddies love something on wheels. Why this should be it is hard to say, but engines, motors, trucks, carts, etc., etc., go straight to the heart of a youngster. You can be quite sure, therefore, that the timber carriage would form a very acceptable present. Moreover it is remarkably



easy to put together, and also it resembles what it is supposed to be—a timber wagon loaded with logs.

The wheels can be bought or cut from an old round pole, say a length of discarded curtain rod. Cut the discs carefully with a fairly fine saw, being generous in the first case with regard to width, the desired thickness being later secured by rubbing flat on a piece of suitable glasspaper.

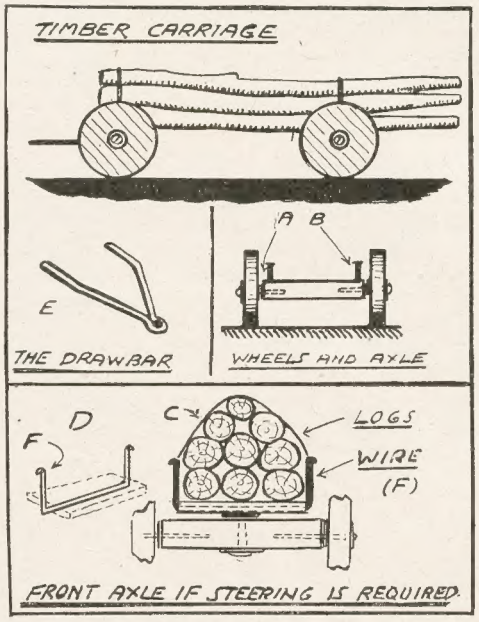
Each pair of wheels is attached to an axle as shown in Fig. 1 (bottom right hand sketch). The discs are held in position by long thin screws, a washer (A) being introduced at both sides to assist easy running.

Further screws (B) are inserted vertically in the ends of the axle (which should not be too thin) to help hold the "logs" in position. In the front axle bore two horizontal holes and then shape the simple "drawbar" (E) from any stiff piece of wire, push this through the holes and then bend the ends down.

A "drawbar" is fitted to make the model quite modern (shafts have gone years ago) and it acts both for realistic coupling to some already existing tractor or the attaching of a pull-string if desired.

All that remains now is to connect the two axles by means of the logs—which form the body in themselves. The "logs" are several carefully chosen "sticks" cut from a tree. They should be fairly straight, about the same length and should give to the finished wagon the proportions shown in the sketch.

The sticks are held together to the axles by a strand of wire as indicated, this being tightened up with a pair of pliers. There is no need to paint this toy, but if it is desired the wheels and axles could be red, the drawbar, screwheads, etc., being black.



Oil Tanker

The oil tank trailer follows the same lines as the timber carriage. Here, however, the axles are deeper and are curved out on top to take the tank, which is a further section cut from curtain rod. The wheels are again discs (sliced from the same length if desired).

A drawbar is also fitted, made of wire. In this case an extra item is the filling cap on top, this being a section of circular wood shaped to go on top of the tank, and held by a screw. Tank and axles are held together by longish screws from below. This model requires paint, the tank being red with the wheels a contrasting colour.

As just described, neither of the trucks will steer and for a very quick-made model this characteristic is really not advisable. But if steering is desired it can be effected by making a rather different front axle in both cases.

Taking the timber carriage first, the logs instead of being put straight on to the axle are mounted on the length of wood (D) (bottom sketch, Fig. 1). Under this, and recessed into it on the lower side goes the length of wire (F). This need not be fastened, for when the binding wire (G) is put over the top of the sticks and secured to the ends of (F), all is tight.

The actual axle taking the wheels comes below. It is just as in the case of the non-steering vehicle but should be quite wide from back to front as also should be the wood (D), this keeping things firm when the drawbar is pulled. Pivoting is best with a small bolt bought from any ironmongers.

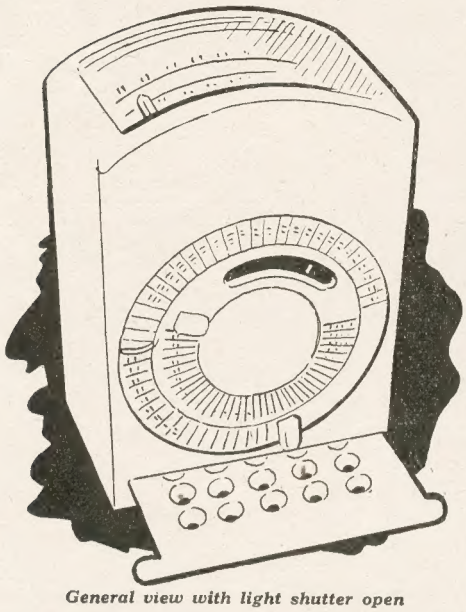
It is possible to maintain a level position for the logs if the back axle is made a little deeper (or packed up a shade if already made), but this does not detract from the appearance of the finished model. With the front axle so arranged the timber carriage will follow nicely any 'pull string' or toy tractor.

The tank truck is made to steer by simply altering the shape of the front axle as shown in the lower sketch (Fig. 2). To prevent the axle pulling over when a drag is put on the bar, make the top surface of the new piece of wood fairly wide as shown in the side view, so as to give a good bearing area on the bottom of the tank. The pivot in this case has to be a long screw prepared by removing the thread from the length (B) which lies inside the axle. Well smoothed with a file the wood will rotate quite easily on the metal.

Often the most realistic impressions can be secured with the simplest of materials and the most elementary of designs. In the main, realism is a matter of broadly correct proportions and outlines rather than fine detail.

For less than 20/- photographers can make for themselves

AN EXPOSURE METER



General view with light shutter open

ONE of the most useful accessories that any photographer—either amateur or professional—can have is a reliable exposure meter, particularly in these days when films are in short supply, and it is necessary to use them to the best advantage with the minimum of poor exposures.

Unfortunately, exposure meters are rather costly, and even good second-hand ones are hard to come by at a price which does not strain the pocket. So it is of interest to describe the construction of one which can be made at an all-in cost of under one pound.

This is made possible by purchasing an ex-Government surplus meter movement which is available from Messrs. Surpluses, as advertised in this issue, and a 22mm. by 40mm. light cell, also obtainable there. The other items required can be found in any workshop or junk room.

It may be mentioned that the exposure meter described here has given the author every satisfaction, and is in every way equal to commercial models.

The Case

This can be made from various materials, but one of the most satisfactory and attractive is sheet Perspex which can be obtained in several colours. A few odd offcuts which can be obtained for a few pence will suffice. The best thickness to use is $\frac{1}{8}$in.

The case is in two compartments, for meter and light cell assembly, with a light shutter sliding in front of the light cell to effect change from high to low light range. The accompanying photographs and sketch should make construction plain. The top Perspex window (clear Perspex) is bent to shape by heating in hot water, when it becomes slightly plastic. The various parts of the case and the shelf can be stuck by using the special cement which makes a very strong job.

The light shutter, which is mounted in the light-cell compartment and slides in and out, has fifteen by 1/16in. holes drilled in it. These holes are countersunk to approximately half the depth of the material by a 3/16in. drill. A projection stuck on the back of the shutter prevents it being removed when in the open position. For use in bright light this shutter is closed, and for dull light it is open.

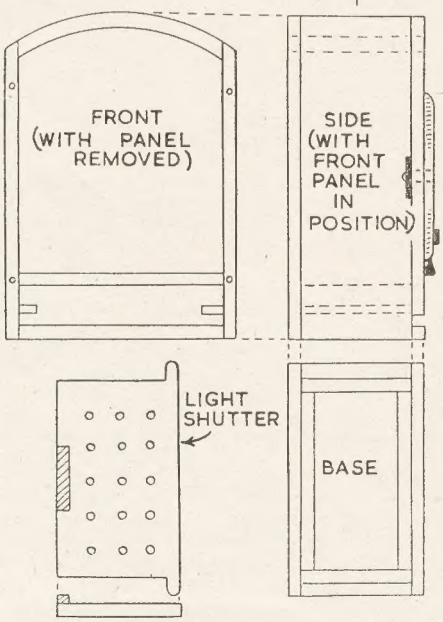
Mounting the Meter and Light Cell

The Perspex shelf or division separates the meter and light cell compartments. Two 4 B.A. screws secures the meter to this shelf. The Perspex can be very easily drilled and tapped to take these screws, or the meter can even be stuck in position if taps are not to hand. Care must be taken to mount the meter so that its scale appears centrally in the Perspex window. Details of a meter scale are given later.

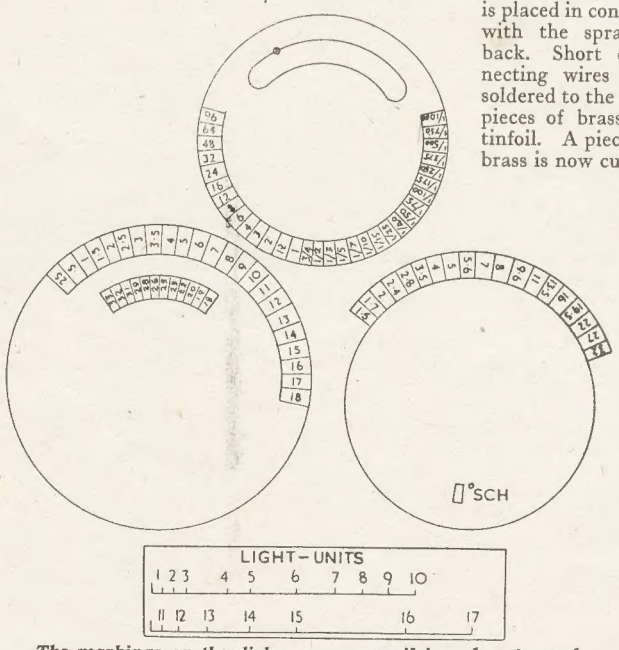
The two connections from the photo electric light cell must be made to the sprayed metal back, and the sprayed metal edge on the face of the cell.

To ensure good contacts a frame of thin sheet brass or tinfoil approximately $\frac{1}{8}$in. wide is cut to the size of the cell. This is placed on the face of the cell and makes contact with the sprayed metal edge on the cell face.

Another piece of brass sheet or tinfoil slightly smaller than the cell, is placed in contact with the sprayed back. Short connecting wires are soldered to the two pieces of brass or tinfoil. A piece of brass is now cut to



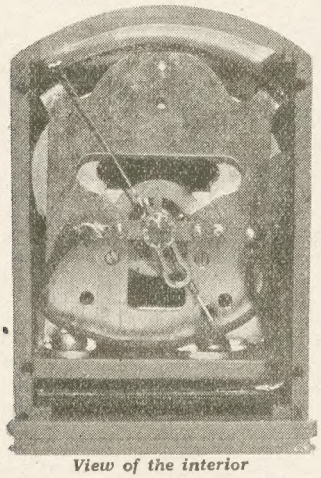
Front, top and side section of case, with plan of light shutter



The markings on the dials—use a magnifying glass to read

the size of the cell, and two pieces of springy metal is obtained approximately ½in. by ¼in. (i.e., two pieces of clock spring).

The whole assembly is now placed in the light cell compartment in the form of a "sandwich" arranged in the following order from the front of the compartment to the back (see diagram and photographs).



View of the interior

The springs should be so adjusted that they hold the whole assembly firmly in position. It should be noted that it is necessary to use a 22mm. by 40mm. light cell, otherwise the calibrated scale described in this article will not be suitable. Other sizes and types of light cells may be used of course if the reader calibrates his own scales.

Connections to Meter

The connections from the two brass or tinfoil contacts are taken through a small hole in the dividing shelf or partition, and soldered to the meter contacts.

A copy of the meter scale is printed here full size and can be cut out and used direct on the meter by readers.

Conversion Dials

These consist of one fixed and two movable scales mounted concentrically. The centre movable scale is marked in times from 1/1000 seconds to 96 seconds. The second movable scale is marked in lens apertures from f2 to f32 in 19 steps. The fixed scale is in "light units" and corresponds to the meter scales. There is also a secondary fixed scale to make allowance for differing film speeds.

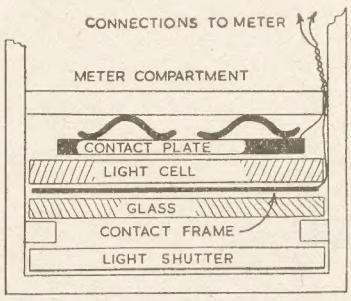
These dials could be constructed from a variety of materials depending upon the facilities available. Discs can be cut out from 1/16in. Perspex, and the figures, etc., scratched on with a scriber, paint being then rubbed in to make the markings prominent. It would be possible to stick the reproductions of the dials in this article on to thin metal discs, and varnish them over to ensure permanency.

Hints on Use

(1) Always point meter slightly downwards.
(2) Note meter reading. If light shutter is closed, read from HIGH scale. If open read from LOW scale.
(3) Turn dial No. 2 to film speed.
(4) Turn indicating spot on dial No. 1 to Light Unit No. as read on meter scale.
(5) Speed and aperture can now be read off scales on dials Nos. 1 and 2.

Adjustment and Use

Before use, the meter should be adjusted to zero by the controlling springs. It is advisable to disconnect the light cell when doing this. Once adjusted it is unlikely to require further attention.



Section of light cell compartment

If the meter scales have been copied carefully, it will be found that the meter is quite accurate enough for normal use. If another meter is available it could be checked for calibration and any changes made by altering the position of the indicating spots on the movable dial.

When Preparing Solutions

WHEN mixing chemical solutions the powder ought not to be dropped into the water in one mass, as it would then probably clog together and take considerably longer to dissolve. Nor should the water be poured on to the chemical. The correct way is to bring the water to a gentle swirl with the stirring rod and sift the powder in gradually.

Where quantities are given in ounces it is useful to remember that 20 oz. of water is equivalent to 1 pint. A good idea is to keep a glass jar specially for measuring and mixing the solutions, marked off with strips of paper to indicate its capacity at different levels—say, for 4, 5, 10, 15, and 20 ounces.

A percentage solution is prepared by taking so many parts of solid and making up to 100 parts with water. Thus, 100 oz. of water in which 10 oz. of chemical are dissolved would be a ten per cent solution.

* * *

Home Boot Repairing

BOOT and shoe repairing comes within the scope of the home craftsman and those who tackle the job find real pride in being able to turn out smartly mended footwear, at the same time keeping the family well shod at minimum cost. The main outlay will be five or six shillings for an iron Last.

It will be noted that the Last has three feet—one to fit the soles of larger boots and shoes, another for smaller footwear, and another rather different in shape for use when repairing heels. It is designed to stand in the required position without further support.

A quarter of a pound of boot nails will probably be sufficient for a start, the ⅝in. size for thick soles and smaller ones for the lighter shoes. Leather soles and heels may be bought already cut to shape and requiring only final trimming. It may come somewhat cheaper, however, to choose a piece of leather of about the right size and thickness and cut the pieces out as required. Bits left over often come in useful—say, for straightening up the heels.

Practice will make the amateur proficient, but it may be mentioned that many workers find it a good idea to make new leather more durable by soaking in water for a short time, then when nearly dry again hammer all over on the last, working outwards from the middle.

Having cut the sole roughly to shape, nail holes should be pricked fairly close all round, and when nailed in position there will be a little further trimming with a knife, followed by a rasp to smooth up the edges.

* * *

Tin

ALWAYS glad to know more about the materials craftsmen use, I was naturally interested in a short talk on tin. One fact which rather surprised me was that an ounce of this metal will roll out into more than five square feet of tinfoil.

For thousands of years, it seems, Britain was a pioneer in tin, the bulk of world supplies coming from Cornwall. Towards the end of last century, however, places like Malaya began to produce big quantities on a much cheaper scale, and took precedence as the world's largest source of supply.

BE TALLER. Quickly! Safely! Privately! No Appliances — No Tablets — No Dieting. Details, 6d. stamp.—Malcolm Ross, Height Specialist, BCM/HYTE, London, W.C.1

LONELY? Then write Secretary U.C.C., 5B. B. Hay St., Braughing, Herts. Genuine. Est. 1905.

MODELS: you can make lasting stone-hard models with Sankey's Pyruma Plastic Cement. Supplied in tins by Ironmongers, Hardwaremen, and Builders' Merchants. Ask for Instruction leaflet.

PERSONS required make fancy goods at home. Write for details—Melton Manufacturing Co., Southgate Street, Leicester.

TRANSFERS for decorating toys, trays, furniture, fancy goods. List and samples free. Flowers, pixies, dogs, nursery rhymes.—H. Axon Harrison, Jersey.

STAMPS — Quality packets all different. 50 Switzerland 2/6, 100 Denmark 3/-, 50 Norway 2/9, 50 China 2/9, 50 Canada 2/9, 50 Holland 2/3. Send 2½d. stamp for approvals. — BCM/POSTAIDS, London, W.C.1.

COPPER wire. Enamelled, cotton, silk-covered. Litz. Most gauges. Ebonite, Tufnol, Paxolin tubes, rods, panels. B.A. screws, nuts, washers, soldering tags, eyelets. Wireless crystals, permanent detectors. Latest radio publications. List S.A.E. Write P.R.S., 33 Bourne Gardens, London, E.4.

CANADIAN Silver Jubilee set, free to all requesting approvals. (Without approvals 9d.) Postage please.—H. A. Smith, 13 New Road, Scole, Diss, Norfolk.

BLUSHING, shyness, nerves, self-consciousness, fears, ended. Details under plain cover 1d. — Stebbing Treatment, 28 (HB) Dean Road, London, N.W.2.

FOR driving models or handicraft machines—Brook "Cub" motors. ¼ H.P. single phase split phase Electric motor. Obtainable from your electrical contractor.—Brook Motors Ltd., Empress Works, Huddersfield.

MAKE money from making models. See our new instructive book on this subject. Post 2/9.—Sutton Models, Billericay.

NEW Magic tricks for Christmas. Crazy cut-ups 6d., grand party trick. Bumper lists of America's latest 3d.—De Hempsey, 363 Sandycombe, Kew Gardens, Surrey.

£5 to £20 weekly earned at home, running your own Mail Order business. Details 1d. — Stebbing Publications Ltd., (HB) Naphill, High Wycombe.

ABSOLUTELY free—two tricks, Magic Magazine, lists of easy-to-do conjuring tricks, details of Magic Club. Enclose 6d. P.O. to cover postage.—Sid Sonalli, Birmingham, 13

BE taller in 14 days, or money back. Details 1d. — Stebbing System, 28 (HB) Dean Road, London, N.W.2.

PRESSED Metal Wheels. Per dozen ¾in.—9d. 1in.—1/-. 1½ins.—1/3. 2ins. —1/6. 2ins. (special quality) 1/9. Per gross, ¾in.—6/6. 1in.—7/6. 1½ins.—9/-. 2ins.—12/-. 2ins. (special quality) 15/-. All prices inclusive of purchase tax, postage and packing. Immediate despatch. Doll's House windows, doors, fireplaces. Illustrated catalogue 3d. (Trade supplied).—Jasons, 135 Nags Head Road, Ponders End, Middlesex.

HOME Movies, Projectors, films, 9.5, in great variety. Sale, hire, lists, stamp.—Wayland, 223 Longley Road, Tooting Junction.

DOLL'S House fittings and papers, send S.A.E. for list. Doll's house plan special, send 2/6. Trade supplied. —Zimplan, 88 Ware Road, Hoddesdon.

ALL-METAL Chassis designed for mounting Animal etc., cut-outs. Green platform (6ins. by 2 ins.) fitted with 1½ins. red or yellow wheels. Stove enamel finish. 1/9d. each post paid. Reduction for quantities.—Joyden Toy Co., 193 Chase Side, London, N.14.

SPOKE Wheels, treaded tyres. 8ins., 9ins., and 12ins. overall diameter. Also rubber tyred metal disc wheels ranging from 2ins. to 9ins. Small or large quantities supplied. Write requirements.—Joyden Toy Co., 193 Chase Side, London, N.14.

"POWER Tools You Can Make." Famous "Popular Mechanics" plans and constructional details for building drilling machine, jig-saw, band saw, lathe etc. All from readily available materials. 12/6 only, post 7d. Illustrated lists 3,000 American Homecraft books, plans, magazines 6d.—BCM/PUBLICATIONS (H) London, W.C.1.

THE interest in car numbers never ceases. "Where's That Car From?" containing all the car index marks, alphabetically arranged. 54 pages 6d. Now in its sixth edition. From all newsagents.—Raleigh Press, Exmouth.

J. McGARRIGLE & SONS for aeroplane and ship kits. All accessories, stamps, lists 3d. wholesale lists 4d.—43 Purbeck Road, Romford.

TOY casting moulds, farm animals, soldiers, wallplaques, ornaments, dogs, etc. The largest selection of metal and plaster moulds available. 6d. illustrated catalogue. S.A.E. for list.—Nuthall, 69 St. Mark's Road, Hanwell, W.7.

FREE! Extra special Br. Col. packet scarce Jubilee, Coronation, Victory, Zoological new issue stamps. Request approvals (2½d.)—Thompson, 2 Western Gardens, London, W.5.

POST FREE—fascinating steel tracing machine for copying and enlarging magazine drawings, maps, etc. Price 5/-.—Clayton, 16 Westminster Road, Bradford.

STAMP Albums, packets, accessories, etc. Lists free to all approval applicants.—R. P. Hawkins (Dept. 80), 247 Rotherhithe New Road, S.E.16.

FREE! Scarce triangular Liberia, Air-mail, Venezuela, Commemoratives, etc. Request approvals. Postage 2½d.—James, 67 Coledale Drive, Stanmore, Middlesex.

LONELY? Join Friendship Circle. Details 6d.—Secretary, 34 Honeywell Road, London, S.W.11.

DO YOU collect stamps of famous men — railways — airplanes — animals — ships — birds? Packet containing one of each free. Ask for approvals.—Norman A. Barker, 13 Cunningham Road, Liverpool 13.

THE MOST enjoyable hobby of all. Piano playing. George Ashburnham's postal course is easily followed to its final stages.—APM (53), 3 Ayrway, Romford.

PERSONS required to make ladies' belts and fancy goods in spare time.—Dept. 3, Somat Plastic Co., Ltd., 8 Middlemarsh, Nottingham.

PERSONS required immediately to make leather goods in spare time. Write—Dept. 11, Empire Co., 117 Nottingham Rd., Loughborough.

FREE! Ten Portugal! Request approvals. Postage 2½d. — Fantozzi (HW), Whitegate, Northwich, Cheshire.

WANTED.—Hobbies Pattern for Eiffel Tower. Reply—John K. Murray, 191 West Street, Durban, South Africa.

YOU can write names, monograms and designs in gold, silver and colours on leather, Perspex, wood, lampshades, etc. Beautiful results, easy as writing with a pen. Complete kit 7/6 post free. Agents wanted.—W. Dawson, Dept. M.1, 130 Park Street, Oldham.

NEON lamps for assembling "Fairy Glolight" Christmas tree decoration sets. Sample 3 lamps for 4/6, 15/- doz. Holders free.—Lucas, 22 Hengrove Road., Bristol 4.

PROFITABLE hobby — make leather goods and help production. Write for details etc.—Dept. 39, Wearwell, Products Co., Saxone Buildings, 2 Tarleton St., Liverpool.

HOW I made a china cabinet in seasoned oak, under present-day conditions, costing less than £3, including six special features. Plan and full instructions 3/6.—T. Beckitt, 101 Dalefield Rd., Normanton, Yorks.

FOR stamps which are sure to please, send 3d for approvals and improve your collection.—J. Shiner, 25 Myrtle Street, Bristol 3.

Printed by BALDING & MANSELL, LTD., London and Wisbech, and Published for the Proprietors, HOBBIES LTD., by HORACE MARSHALL & SON, LTD Temple House, Tallis Street, E.C.4. Sole Agents for Australia and New Zealand : Gordon & Gotch (A'sia) Ltd. For South Africa : Central News Agency Ltd. Registered for transmission by Canadian Magazine Post.